HARRINGTON'S OPERATION OF INTRAPERITONEAL CYSTOTOMY,

WITH REPORT OF FOUR CASES.

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On June 10, 1893, before the Obstetrical Society of Boston, Mass., Dr. F. B. Harrington read a paper entitled "On the Feasibility of Intraperitoneal Cystotomy, with the report of a case." This paper was subsequently printed in the Annals of Surgery in October, 1893,—fifteen years ago.

Harrington in this paper states that after "repeated trials upon the cadaver it has been found that the bladder may be sewed up intraäbdominally so that it resists much distention both by water and air." Harrington cites the accidental incision of the bladder during laparotomy with subsequent safe suturing; the successful treatment by suture of the bladder for penetrating wounds; the safe suture of the stomach, gall-bladder, and intestine. He then asks very pertinently, "why then should the bladder not be approached by the route which affords the greatest facilities?" Harrington further says, "with proper care it is probable that the bladder can be as certainly shut off as the stomach or intestines. The flow of urine through the ureters is, as a rule, by drops, and can be easily taken care of by an assistant with sponges."

Again, "intraperitoneal cystotomy may be performed for tumors of the bladder, for enlarged prostate, for disease of the ureters, for cases of stone in the bladder of great size, and for sacculated stone. There are advantages in the operation which certainly, at times, render it preferable to suprapubic cystotomy." Harrington then describes the steps of the operation in great detail,—the walling off of the intestine, the opening of the bladder, the control of hemorrhage within the bladder, the closure of the bladder wound, the complete closure of the abdominal wound. He then says, " the intraperitoneal operation does not interfere with suprapubic drainage, should drainage be necessary. As a rule, however, drainage will not be necessary, except that which can be obtained by the urethra."

Then follows the report of an intractable case of hemorrhagic cystitis for which much had been attempted with little success. Harrington decided that by means of an intraperitoneal cystotomy he could inspect and treat the interior of the bladder most advantageously. He operated by this method, curetted certain areas of the bladder mucosa, excised other areas to sound tissue; closed the bladder tight by suture; closed the abdominal wound tight by suture and drained the bladder. The subsequent history shows that the woman was practically cured of her difficulty.

The conception of the operation of intraperitoneal cystotomy, the experimental work upon the cadaver to place the operation upon a sound physical basis, the demonstration upon man that it is a safe and satisfactory procedure, the advocacy in 1893 of this operation in the ANNALS OF SURGERY as a new and tried operative procedure, subsequent operations for tumor of the bladder done by Harrington as yet unpublished,—these facts establish intraperitoneal cystotomy as a definite and original surgical operation. This has been the work of Harrington. The procedure, for whatever cause undertaken, should very properly be known as Harrington's operation of intraperitoneal cystotomy. We have been unable with the literature at our disposal,—and a careful search has been made,—to discover any similar systematic and constructive work done at an earlier time by any other surgeon. The recent report of Dr. Charles Mayo in the ANNALS OF SURGERY for July, 1908, serves as valuable independent evidence in favor of this established operation of Harrington.

The writers, working in the same surgical clinic with Harrington, wish to report here four cases of intraperitoneal cystotomy. They are indebted to Dr. Harrington for suggestions and encouragement in connection with these cases.

Case I.—W. T. (No. 157,342), male, 42 years old, married, a glass packer, was admitted to the Massachusetts General Hospital on Dr. Mixter's service, on March 6, 1908, recommended by Dr. John E. Somers, of Cambridge, and was kindly transferred to the writer for treatment.

The family history and previous history are unimportant.

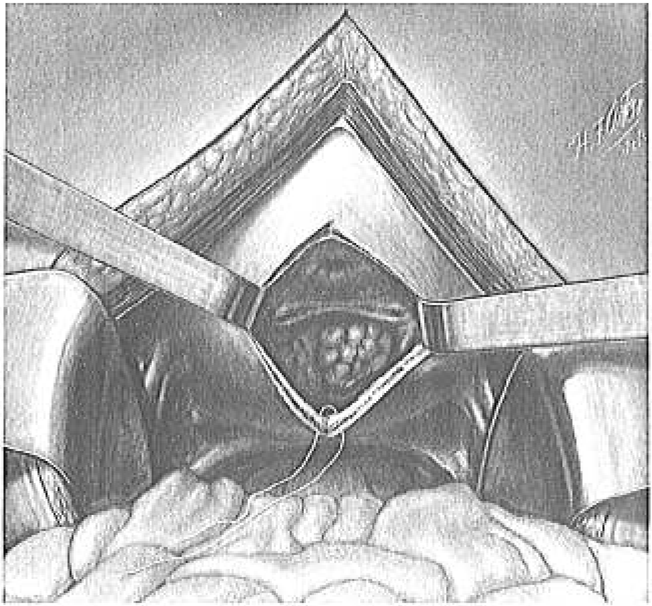
Six months ago first noticed that the urine was bloody. There was no pain at this time, and the blood soon disappeared. Six weeks ago the urine again became bloody, but cleared up in two days. Patient stayed in bed ten days, and then returned to work. Then began to have increasing frequency of micturition accompanied by pain; finally requiring catheterization twice daily.

Examination showed a well-developed and well-nourished man of striking pallor. Chest and abdomen negative. External genitalia normal. By rectum prostate felt to be symmetrically enlarged and very hard. Urine contained blood, with small amount of pus and bladder epithelium.

Cystoscopic examination of March 9, 1908, is recorded as follows: "Cystoscopy shows a partly villous and partly smooth rounded tumor, size of a small egg, intimately connected with prostate and hanging down from above the internal urethral orifice: its base cannot be seen. Floor of the bladder inflamed with a few small calcareous deposits. Ureteral openings normal. Cystoscopic diagnosis: tumor of bladder, probably malignant."

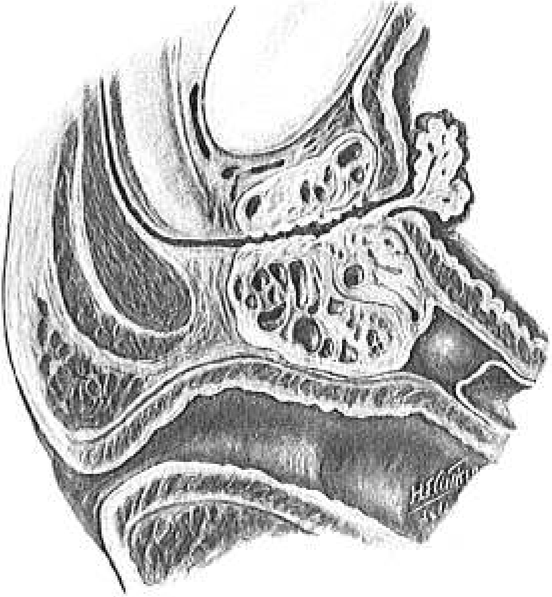
March 13. Operation (L. D.): Bladder washed out and filled with boric acid solution. Usual suprapubic cystotomy incision. A lobulated tumor arising from close to the internal urethral orifice could be felt. On account of the limitation of the cystotomy incision, it was difficult to make out the character and attachments of the tumor. The bladder was therefore dried and packed with gauze, and the abdominal wall incised upwards for about three inches, opening the peritoneal cavity; the intestines were walled off with a gauze pack, and the original cystotomy incision extended backwards in the median line for about two and one-half inches (Fig. 1). This gave a splendid approach to

FIG. 1.



Illustrating Harrington's intraperitoneal cystotomy for new growth of the urinary bladder. Note long abdominal incision well retracted with broad retractors; intestestinal coils completely concealed and protected by gauze; low posterior incision into bladder held open with narrow retractors; an anterior retractor in the bladder is often helpful; internal meatus; ureteral orifices; tumor; traction suture; deep pelvic folds, large iliac vessels, rectum.

Fig. 2.



Case I. Semi-diagrammatic drawing of median section of pelvis, showing cystic prostate, with reconstruction of bladder tumor arising by a pedicle from within the prostatic urethra.

the tumor, and it was then seen to be pedunculated with the pedicle actually arising from within the prostatic urethra (Fig. 2). The

FIG. 3.

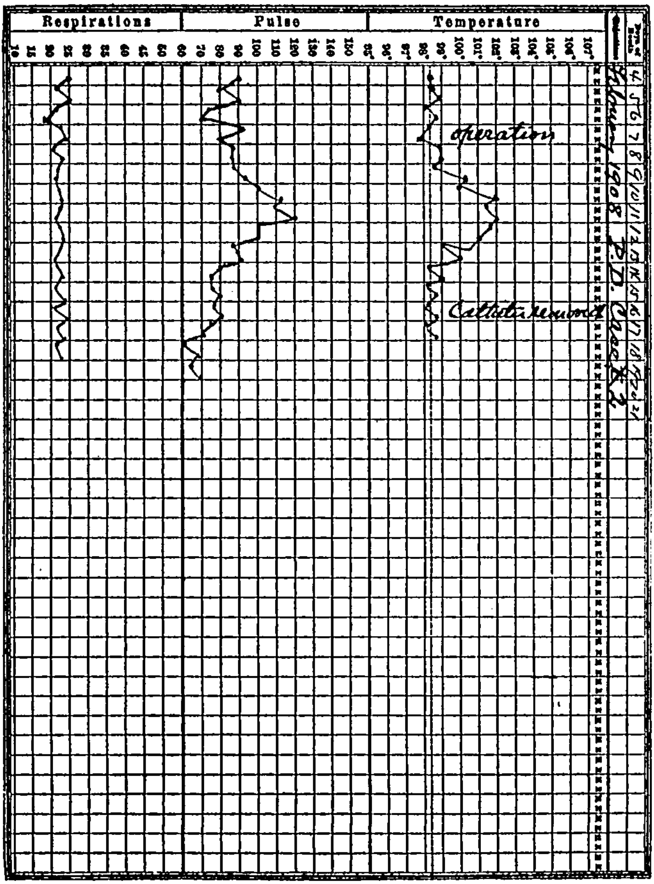


Chart of temperature, pulse, and respiration of Case 1 just before and following operation.

pedicle was clamped and the tumor removed with scissors. A median one-inch incision was then made into the prostate just below the urethral orifice, and the entire prostate gland was readily enucleated in one piece, including the prostatic urethra. The wound was packed with gauze, and the posterior portion of the bladder incision closed with two layers of catgut sutures. Walling off sponges removed and peritoneal cavity closed. Bladder was then washed out and closed about a drainage tube and one gauze wick, which led to the cavity from which the prostate was enucleated. There was very little postoperative bleeding. The wick was removed on the third day and the tube in one week, when catheter drainage through the urethra was instituted. Convalescence was uneventful except for an attack of epididymitis. Clinical chart of this case is reproduced in Fig. 3.

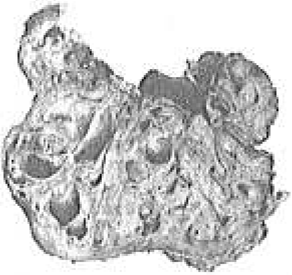
On April 16, 1908, the patient left the hospital with the suprapubic wound healed solidly. Urine was voided through the urethra without pain, but at somewhat diminished intervals. The urine showed some turbidity due to pus; no blood. When seen one month later the patient was free from all symptoms and had returned to work.

Remarks.—This case illustrates the value of intraperitoneal cystotomy for approaching a deep-lying tumor of the bladder, which may be quite inaccessible through the usual extraperitoneal cystotomy. The chief interest in the case, however, attaches to the nature of the growth. The pathological report by Dr. W. F. Whitney was as follows:

" An elevated growth of the bladder-wall near the opening of the urethra about 3 cm. in greatest diameter. With this was the prostatic gland, the outer portion of which was torn and lacerated, and on section it was found to be honey-combed with relatively large cysts between which there were very thin partition walls (Fig. 4). Some of the cysts were filled with a little parenchymatous tissue.

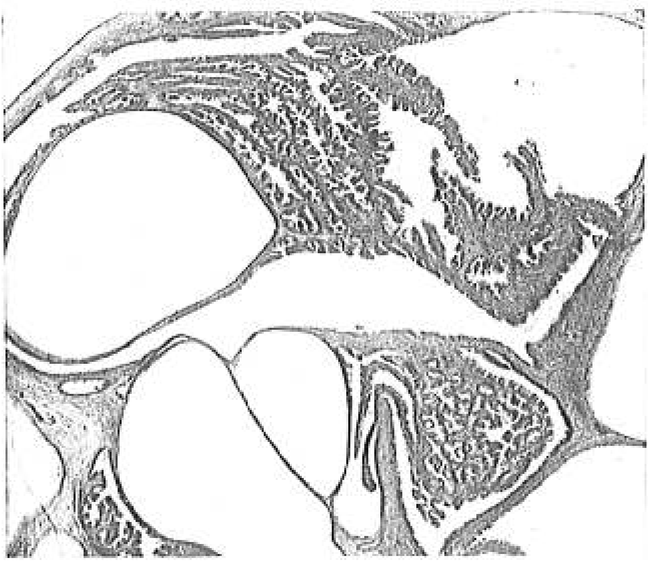
" Microscopical examination of the prostate showed the cyst cavities to be lined with a flattened epithelium in places, and in others the epithelium was longer, and more cylindrical. The parenchymatous portions presented a papillary growth from the surface of the cysts which almost completely filled the cavities (Fig. 5). The tumor from the bladder (Fig. 6) was covered on the surface with epithelium, beneath this was a growth of glandular tissue in general appearance similar to that of the papillary

Fig. 4



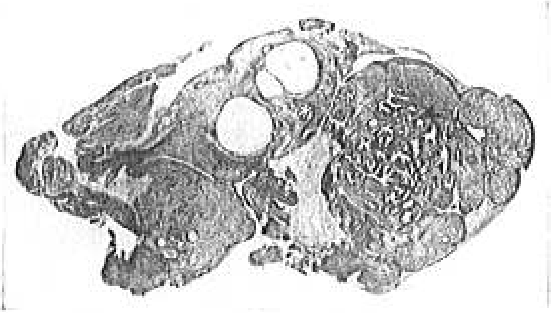
Case. I. Photograph of median section of prostate showing cystic condition. Actual size.

Fig. 5.



Case I. Section of prostate showing the papillary epithelial ingrowths into some of the cyst cavities.

Fig. 6.



Case. I. Section of tumor which projected into bladder showing the same process to a less marked degree.

growth in the prostate, and in this tumor there also were a few small cysts.

"*Diagnosis.*—Papillary cyst-adenoma of the prostate, with extension into the bladder-wall."

Dr. Hugh Young, in his accurate study of the pathology of prostatic hypertrophy,* in describing the glandular or adenomatous form, speaks of the dilatation of the acini, with papillary projection of epithelium which often occurs, and pictures some illustrative cases. The above case is the most extreme example of this process which I have seen hitherto reported and is sufficient, I think, to warrant the name of papillary cyst-adenoma. The condition simulates exactly the tumor of the same name which is of quite frequent occurrence in the female breast.

CASE II.—P. D. (M. G. H., No. 156,894, Feb. 4, 1908). A man 39 years old, married, bartender. He is large and stout and has always been well. He has passed dark blood with clots painlessly for ten days. The urine has been clear for the four days just previous to entering the hospital. Dr. Chute, upon cystoscopy, discovered a papilloma of the bladder.

Cystoscopy by Dr. Davis, at the hospital: Bladder holds six ounces without discomfort. Just above the left ureteral orifice and close to it there is a pinkish papillary tumor about the size of a silver quarter. Remaining bladder-wall appears normal. Both ureteral openings normal in appearance and functionate naturally. The tumor lies so close to the left ureteral orifice that when the urinary stream is emitted the villous processes of the tumor are set in motion.

Diagnosis.—Single, pedunculated, lobulated papilloma of the bladder.

Operation by C. L. S., February 7, 1908: Intraperitoneal cystotomy; removal of growth; closure of bladder and abdominal wall; drainage of bladder by No. 12 soft rubber catheter. Bladder drainage was discontinued February 16, that is, nine days following the operation. There was a slight amount of bleeding following the operation which lasted, evidenced by a slight reddish tinge in the urine, until February 22, that is, for fifteen days following the operation. He sat up February 28. March 1 he was discharged from the hospital. The urine at that time was slightly turbid, with considerable pus; the cloudiness was lessening daily. The abdominal wound was solid. There was no frequency of micturition and no blood.

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* Johns Hopkins Hospital Reports, xiv, 128.

Pathological Report by Dr. Whitney, February 7, 1908 (82–15).—" A soft papillary growth, many of the filaments being 1 cm. in length. Microscopical examination showed fine vascular and fibrous stalks covered with a thickened layer of epithelial cells. As far as could be determined there was no infiltration of the deeper tissues.

" *Diagnosis.*—Villous papilloma."

August 1, 1908, six months after the operation, the patient writes, " I am working every day, averaging about sixty hours a week. There is no blood in my urine and I have very little trouble with my bladder. My bladder is all right."

Case III.—R. G. M. (M. G. H., No. 157,169, February 24, 1908). A man 41 years old. Has always had good health. He first had hæmaturia one and a half years ago. One year ago an appendectomy was done for acute appendicitis. Since the appendectomy he has had no hæmaturia until two weeks ago. For the past five days the urine has not been free from blood. There is slight frequency of micturition.

Cystoscopy by Dr. Davis at the hospital: Bladder holds six ounces. Washes clear. No bleeding. On the right lateral wall of bladder, overhanging and external to the right ureteral ridge, is a lobulated papillary tumor of pinkish color with numerous shreds of fibrin attached. The urinary jet sets the tumor in motion. Whole tumor is seen to pulsate markedly. Left ureteral orifice normal. Bladder-wall generally injected but otherwise normal. No other tumor seen.

Diagnosis.—Papilloma of bladder.

A transperitoneal cystotomy was done February 28, 1908, by L. D. and C. L. S., the tumor removed and the base of the tumor thoroughly cauterized. The patient was discharged from the hospital March 17, 1908. Cystoscopy, before he was discharged from the hospital, showed a linear scar, healed perfectly, in line of bladder incision. A depression at the site of tumor. The right ureteral orifice was clear. A small loose ligature or suture was seen in one edge of the site of operation.

Pathological Report (82–74) by Dr. Whitney.—" A papillary growth measuring about 2.75 cm. in greatest diameter with a broad base and long vascular stalks extending from the surface. On microscopical examination thin stalks of fibrous tissue containing large blood-vessels were found covered with several layers of columnar epithelium. As well as can be determined there was no infiltration of the base.

"*Diagnosis.*—Papilloma, probably malignant."

A letter from the patient dated July 24, 1908, that is, five months after operation, states that he is perfectly well. There is no longer any blood in the urine. He has no pain, and is doing his regular work.

Case IV.—A. J. (M. G. H., No. 157,973, O. P. D., No. 104,806, April 17, 1908). A man 33 years old, married. Patient sent from the out-patient department by Dr. J. M. Jackson. He has always been well. For the past seven months the urine has been bloody. Four months ago he first had pain on micturition. The hæmaturia was intermittent, at first every two weeks, then every week, then every three days. He has lost ten pounds in weight during the past seven months. A well developed man. Nothing remarkable in his physical examination. Urethral discharge purulent.

Cystoscopy by Dr. Davis at the hospital: Difficult because of persistent bleeding from the bladder. Surrounding the internal meatus is a shaggy, ulcerated and partly necrotic mass, beyond which a moderately inflamed bladder-wall may be seen. The cystoscopic picture suggests strongly an ulcerated, malignant growth. Rectal examination does not confirm this cystoscopic diagnosis.

April 28, operation by C. L. S. Transperitoneal cystotomy. Excision of tumor, curettage and cauterization of the base of tumor. Suprapubic drainage of bladder. Abdominal peritoneal wound closed completely. Bladder washed every hour for first twelve hours. May 6, or eight days after operation, the urine was clear and contained no blood microscopically. Ten days after operation sitting up in bed, May 25, discharged from the hospital to the doctor at home and to the out-patient department.

Urine examination, April 18: Normal, acid, 1016, slight trace of albumin, sugar absent, pus, blood and a few squamous cells are present.

Pathological Report by Dr. Whitney, April 28, 1908 (84–92).—"The tumor was a soft, solid papillary growth 4 cm. in diameter, more or less lacerated. Microscopical examination showed infolded masses of large epithelial cells separated by vascular bands of fibrous tissue.

"*Diagnosis.*—Malignant papilloma."

A report from the patient August 1, 1908, three months and a half after operation, said that he was "feeling well."

Remarks.—The ordinary suprapubic approach to the interior of the urinary bladder is often unsatisfactory. Unsatisfactory because the interior of the bladder is inaccessible, hemorrhage is not readily controlled. The most striking fact about the Harrington operation, is the remarkably easy access to the interior of the bladder, especially to the base and posterior surfaces. These are the parts most often requiring operation. Not only is the access to the bladder rendered easy but manipulation of instruments within the bladder is unobstructed by this approach.

The abdominal incision should be a long one, from the symphysis to the umbilicus. If the abdominal wall is thin a shorter incision will be needed than if the abdominal wall is thick, because of fat and muscle. The place of the incision in the bladder will be determined largely by the situation of the growth to be removed. Most growths lie low in the bladder. Ordinarily, therefore, it will be best to incise the bladder not high up but low down toward the rectal wall. The tendency is to open the bladder too near the peritoneal attachment. If this is unwisely done it will be found that in order to get to the base of the bladder an unnecessarily long posterior incision in the bladder-wall will be required. The opening of the bladder posteriorly and low affords satisfactory access to the field of operation.

A temporary suture of linen or catgut, placed immediately upon opening the bladder, as shown in the drawing (Fig. 1), through all the coats of the bladder-wall at the most inferior angle of the bladder wound, will serve as a tractor of considerable assistance in steadying the bladder, and it will mark the situation for the lowermost sutures to close the bladder wound.

The method of closure of the bladder wound in all cases here recorded was in layers. Catgut being used for the mucous membrane and muscular layers and linen for the peritoneal layer. Continuous sutures in each instance were used. The peritoneal continuous suture was reinforced by several interrupted peritoneal linen stitches.

All bleeding from the seat of operation within the bladder should be checked before closing the bladder. The ordinary method of control of hemorrhage by suture ligature, simple ligature and by actual cautery may be employed.

Postoperative drainage of the bladder was used in each of these cases; by the urethral catheter in three cases, by suprapubic drainage in two cases. The postoperative urethral catheter drainage is not always necessary. It may be positively indicated by a continuous oozing of blood. Frequent irrigation of the bladder without urethral drainage may suffice to get rid of accumulated blood.

One of these cases illustrates the use of the intraperitoneal cystotomy after exploratory extraperitoneal suprapubic cystotomy had shown the inaccessibility of the growth. This same case illustrates the ease and safety of suprapubic drainage following intraperitoneal cystotomy.

The intraperitoneal cystotomy of Harrington is not here advocated as a routine procedure for all urinary bladder growths, but for those which are inaccessible by the usual routes, and for those which require removal of the whole thickness of the bladder-wall in any part.